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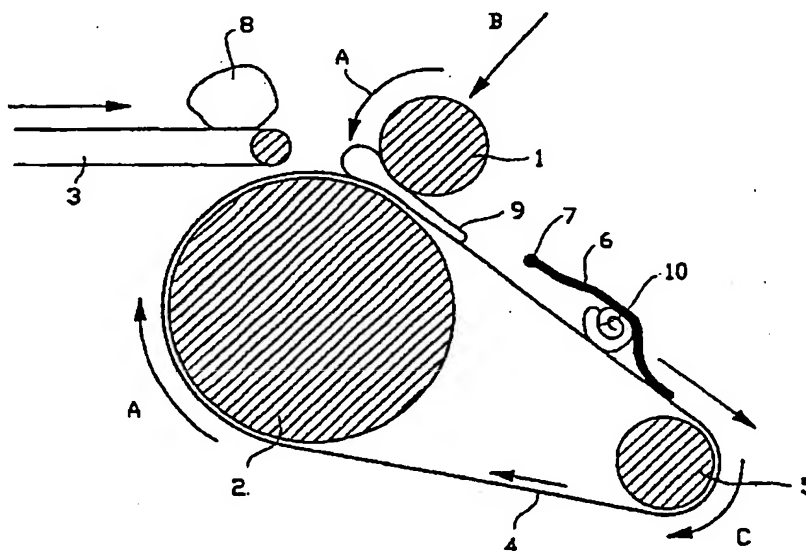
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[Continued on next page]

(54) Title: DEVICE FOR FORMING A DOUGH PORTION



(57) Abstract: Device for forming a dough portion comprising a pressure roller (1) and a counter roller (2) placed below it for in between them rolling out the dough portion into a dough slice (9), wherein the device comprises a conveyor belt (4) for conveying and supporting the dough slice (9) to a further treatment device (6) during and after rolling out, wherein the conveyor belt (4) is passed through between the pressure roller (1) the counter roller (2) and abuts the counter roller (2). The conveyor belt may and be

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Device for forming a dough portion

The invention relates to a device for forming a dough portion, particularly for rolling out the dough portion into a dough slice.

In a known device for forming a dough portion the dough portion in the shape of dough ball is passed between two rollers that roll out the ball into a flat dough slice. Said dough slice is rolled up into a dough strand in a next treatment.

The known device is provided with a small pressure roller and a large counter roller underneath it. The diameter ratio between the counter roller and the pressure roller is 4:1. In the course of time, this ratio experimentally proved to be a properly functioning ratio. The pressure roller is not placed straight above the counter roller, but slightly downstream of it. The operation is as follows. The supplied dough ball is placed on the counter roller, and is subsequently rolled out between the pressure roller and the counter roller. The dough slice remains stuck to the counter roller and is conveyed along with the counter roller over approximately 1/4 of the diameter. Subsequently the dough slice is peeled off from the counter roller by a peeling roller having a small diameter, that is placed close to the counter roller surface and rotates at high speed in the same direction of rotation as the counter roller. The side of the peeling roller oriented towards the counter roller thus carries out an opposite motion with respect to the side of the counter roller oriented towards the peeling roller, for peeling the dough slice off. The peeled off dough slice is subsequently deposited on a conveyor belt. Means for rolling up the dough slice into a dough strand are subsequently present on this conveyor belt.

A drawback of the known device is that the production capacity of this device is limited by the peeling roller. Too high a throughput speed of the dough may result in failures because the dough slice is not correctly peeled
5 off from the counter roller.

A further drawback of the known device is that the dough slice has to be conveyed along with the counter roller. At high passage speed, and thus high speed of rotation of the counter roller the dough slice may get detached from
10 the counter roller as a result of the centrifugal force. Thus the position of the dough slice in the known device may vary as a result of which problems may arise in the further treatment of the dough slice.

It is an object of the present invention to at least improve on one of these
15 aspects.

To that end the invention provides a device for forming a dough portion comprising a pressure roller and a counter roller placed below it for in between them rolling out the dough portion into a dough slice, wherein the
20 device comprises a conveyor belt for conveying and supporting the dough slice to a further treatment device during and after rolling out, wherein the conveyor belt is passed through between the pressure roller and the counter roller and abuts the counter roller.

The conveyor belt ensures a smooth transition between the rolling out and the further conveyance of the dough slice. As a result the process speed can be higher than in the known devices, as a result of which the production capacity of the device according to the invention can be higher. The dough portion is rolled out directly on the conveyor belt and subsequently the dough
25 slice is lifted, or removed, from the counter roller by the conveyor belt, and conveyed further to a known treatment device. As the conveyor belt supports the dough slice over its entire length, as considered in process
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direction, the dough slice can be lifted from the counter roller in a reliable manner by the conveyor belt. As a result the throughput speed of the dough and thus the capacity of the device according to the invention can be higher than the known device's.

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A further advantage of the device according to the invention is that the dough slice is supported by the conveyor belt immediately after rolling out. As a result the shape and the position of the dough slice in the device according to the invention is continuously controlled, as a result of which the process of forming the dough portion can be reproduced better:

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- deviations in positioning arising in the known device by depositing the dough slice on the conveyor belt can be prevented.

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- deviations in the shape of the dough slice arising in the known device when transferring the dough slice from the two rollers to the conveyor belt can be prevented. The dough namely tends to return to its original shape immediately after rolling out. During transfer in the known device the dough slice is not supported and may shrink unpredictably.

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In a further development of the device according to the invention the conveyor belt supports the dough slice in the further treatment device. The conveyor belt continues into the further treatment device and the shape and position of the dough slice are continuously controlled.

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In an embodiment the counter roller has a diameter that is, preferably several times, larger than the diameter of the pressure roller. The pressure roller can be placed downstream of a vertical plane through the centre line of the counter roller. The conveyor belt can be positioned for conveyance in downward inclined direction.

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In a further embodiment the device comprises a feed conveyor with discharge end which considered in direction of conveyance is situated at a distance upstream of the pressure roller.

Preferably the further treatment device comprises a device for rolling up the dough slice. An advantage of this preferred embodiment is that the final part of the dough strand can be placed at a reproducible position. The final part of the dough strand is the point at the circumference of the dough strand where the end of the dough slice connects to the rolled up dough strand.

In an embodiment of the device according to the invention the conveyor belt extends over practically the full width of the counter roller. The dough is rolled out on the conveyor belt instead of on the counter roller. Behind the roller portion, the conveyor belt will detach from the counter roller in the direction of a circulating roller or tail pulley, and the dough slice will be conveyed along with the conveyor belt. On the path from rolling out the dough ball to the dough slice towards the circulating roller or tail pulley, the dough slice can be rolled up immediately on the conveyor belt. An advantage of this embodiment is that the dough slice is supported over its entire surface.

In an embodiment the conveyor belt is composed from a number of conveyor straps that are placed parallel and with intermediate space. Here as well the parallel and spaced apart conveyor straps ensure that the dough slice rolled out on the counter roller is released from the roller surface and is conveyed onwards in the direction of a circulating roller. The dough slice is now partially supported by the conveyor straps. Now as well a rolling-up device can be placed between the roller portion and the circulating roller.

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In an embodiment of the device according to the invention wherein the conveyor straps form a first belt conveyor, the device comprises a second belt conveyor, which comprises a number of further conveyor straps placed parallel and with intermediate space, wherein the conveyor straps of the first belt conveyor are situated between the conveyor straps of the second belt conveyor at the location of a transition from the first to the second belt conveyor. The use of a number of parallel and spaced apart conveyor straps,

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offers the opportunity to transfer the dough slice from a first conveyor device to a second conveyor device without the shape of the dough slice, at least in direction of conveyance, essentially changing among others due to for instance shrinking of the dough. Namely, by using the combination of a first and a second conveyor device according to this embodiment, the dough slice is continuously supported during the transfer from the first conveyor device to the second conveyor device. Said continuous support ensures that the shape of the dough slice hardly changes for instance because of shrinkage of the dough. A further treatment of the dough slice can now take place on the second conveyor device instead of on the first conveyor device. The second conveyor device here supports the dough slice in a further treatment device, such as for instance a rolling up device.

It is furthermore advantageous when the conveyor straps are cord-shaped or ribbon-shaped. Preferably the counter roller comprises grooves over its circumferential surface in which grooves the conveyor straps have been placed. Preferably the depth and the width of the grooves almost equal the thickness and the width of the conveyor straps, respectively, so that one closed flat surface is offered.

For keeping the grooves in the circumferential surface of the counter roller clean it is furthermore advantageous when the device in the circulation of the grooves comprises cleaning or scraping means for cleaning the grooves.

In an embodiment the surface of the conveyor belt or conveyor straps for supporting the dough slice is adapted for, at least in the direction of conveyance, holding the dough slice. As a result possible shrinking of the dough slice, at least in direction of conveyance, is prevented.

Preferably the surface is provided with a texture. Preferably the texture comprises an undulated pattern and/or a series of notches. The texture can ensure an adhesion of the dough slice to the conveyor belt, which at least

reduces the possibility of shrinking of the dough slice. Moreover said adhesion may ensure that the dough slice does not shift and that its position on the conveyor belt or conveyor straps is maintained.

- 5 It is furthermore advantageous when the device in the circulation of the conveyor belt or conveyor straps comprises cleaning and/or scraping means for cleaning the conveyor belt or conveyor straps.

10 The invention furthermore provides an assembly for forming a dough portion comprising:

a device for rolling out a dough portion comprising a pressure roller and a counter roller placed below it, wherein the counter roller is adapted as a first circulating roller for a conveyor belt,

15 a further treatment device comprising a second circulating roller for a conveyor belt, and

a conveyor belt that is wrapped around the first and second circulating rollers for conveying and supporting the dough portion during and after rolling out to and in the further treatment device.

20 The invention will be elucidated on the basis of exemplary embodiments shown in the attached drawings, in which:

Figure 1 shows a schematic view of a device for forming a dough portion according to the invention;

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Figure 2 shows a side view of the device of figure 1 provided with a device for rolling up a dough slice;

30 Figure 3 shows a schematic view of a device having a number of parallel and spaced apart conveyor straps that are connected to a further conveyor device;

Figure 4 shows a side view of the device of figure 3 wherein the further conveyor device is provided with a device for rolling up a dough slice; and

Figure 5 shows a partial cross-section of a counter roller provided with grooves over the circumferential surface.

An exemplary embodiment as shown in figure 1 comprises a pressure roller 1 and a counter roller 2, which are both rotatably suspended in a frame (not shown). Said device serves for rolling out a dough ball which by means of the supply device 3 is supplied between the pressure roller 1 and the counter roller 2. The supply device 3 deposits the dough ball on the conveyor belt 4 which conveys the dough ball between the pressure roller 1 and the counter roller 2. As a result a smooth transition between the feeding of the dough ball and the rolling out into a dough slice is realised. The rollers 1, 2 are rotatable in the direction A. The pressure roller 1 is also movable along arrow B for adjusting the distance between the pressure roller 1 and the counter roller 2. The device is furthermore provided with a conveyor belt 4 which at one side runs about the counter roller 2, and at the other side runs about the circulating roller or tail pulley 5. A dough ball supplied by the supply device 3 is rolled out by the rollers 1, 2. The dough is rolled out here on the conveyor belt 4 instead of on the counter roller 2, as is the case in known devices. Behind the roller portion the conveyor belt 4 moves away from the counter roller 2, in the direction of the circulating roller 5 which is rotatable in the direction C. A dough slice will be conveyed along with the conveyor belt 4, as a result of which a smooth transition is realised between the rolling out and the conveying of the dough slice. Said conveyor belt 4 will support the dough slice from the moment the dough slice has been formed between the two rollers 1, 2. The material of the conveyor belt may be selected such so as to realise some kind of adhesion between the dough slice and the conveyor belt so that a possible shrinking of the dough slice is prevented. Moreover the position of the dough slice on the conveyor belt 4 can be maintained better due to this adhesion.

Downstream in the direction of the circulating roller 5 of the conveyor belt 4 a further device for treating the dough slice may be placed. Figure 2 shows a device for rolling up the dough slice that has been placed between the rollers 1, 2 and the circulating roller 5. Said rolling up device is for instance formed by a fine-meshed metal net 6 that is attached to a rod 7 above the conveyor belt 4. A dough slice that is moved between the conveyor belt 4 and the net 6, is rolled up by the net 6 from a dough slice 9 into a dough strand 10.

The operation of the device according to the invention is also shown in figure 2. A dough ball 8 is conveyed to the rollers 1, 2 by means of the supply device 3. Between said rollers 1, 2 the dough ball is rolled out into a dough slice 9. Said dough slice 9 is rolled up into a dough strand 10 downstream between the conveyor belt and the metal net 6.

The conveyor belt 4, as shown in figure 1, extends over nearly the full width of the rollers 1, 2. In the exemplary embodiment of the device according to the invention as shown in figure 3, the conveyor belt is composed of a number of conveyor straps 41, 42, 43, 44 and 45 placed parallel and with intermediate space. The dough ball is now partially rolled out on said conveyor straps 41-45 and partially on the counter roller 2 by pressure roller 1. Preferably the counter roller is therefore provided with grooves along its circumferential surface wherein the conveyor straps 41-45 have been placed, and wherein the depth and width of said grooves are almost equal to the thickness and width of the conveyor straps 41-45. In this way an at least practically continuous flat roll-out surface is realised. Behind the roller portion the conveyor straps 41-45 will take along the dough slice in the direction of the tail pulley 5.

The use of a number of parallel and spaced apart conveyor straps 41-45 offers the opportunity to transfer the dough slice from a first conveyor device, formed by the conveyor straps 41-45 circulating about the counter

roller 2 and the tail pulley 5, to a second conveyor device formed by the conveyor straps 52-55 that circulate about the tail pulleys 5 and 51, which are rotatable in the direction C. In the transition from the first conveyor device to the second conveyor device at the location of the tail pulley 5, the conveyor straps 52-55 are placed between the conveyor straps 41-45 of the first conveyor device. At the location of the tail pulley 5 a dough slice will be supported both by the conveyor straps 41-45 and the conveyor straps 52-55. In this way a dough slice is continuously supported during the transfer from the first conveyor device to the second conveyor device, at least in direction of conveyance. This continuous support ensures that the shape and the place of the dough slice are continuously controllable. The further treatment of the dough slice can now also take place on the second conveyor device.

In figure 4 a side view is shown of the device of figure 3. A dough ball supplied between the rollers 1, 2 will be rolled out into a dough slice 9. Said slice is subsequently conveyed by the conveyor straps 41-45 in the direction of the tail pulley 5. At the location of the tail pulley 5 the dough slice 9a is transferred from the first conveyor device I to the second conveyor device II. In said second conveyor device II the dough slice is supported by the straps 52-55 and conveyed onwards in the direction of tail pulley 51. Above this second conveyor device II a device for rolling up the dough slice 9a is arranged. This rolling-up device in this example comprises a fine-meshed metal net 6 that is suspended above the conveyor straps 52-55 from a rod 7. Due to the motion of the conveyor straps 52-55 in combination with the metal net 6 the dough slice will be rolled up into a dough strand 10. The dough strand formed 10 can then be conveyed onwards for a further treatment. From figure 4 it appears that the dough slice from rolling out to after rolling up is continuously supported by the conveyor straps. As a result the process of rolling out and rolling up is better reproducible, and the process can be carried out such that the final part of the dough strand is reproducibly positioned at practically the same place of the dough strand.

In figure 4 cleaning and/or scraping means are furthermore shown for cleaning or scraping off the conveyor belts. Scraping blade 61 is placed in the circulation of the conveyor belts 41-45 of the first conveyor device I. The position of this scraping blade is not critical as long as it is placed downstream from the position where the dough slice 9a is transferred to the second conveyor device or another dough treatment machine. In the same manner the second conveyor device II is provided with a scraping blade 62 for scraping the conveyor straps 52-55 clean. Finally scraping blades 63 are arranged for cleaning the grooves and/or the roller surface of the counter roller 2. It will be clear that in case the conveyor belt extends over nearly the full width of the counter roller, the scrape blade 63 can be dispensed with.

Figure 5 shows a cross-section of a counter roller 2 which over its circumferential surface has been provided with grooves 71. The grooves 71 in this exemplary embodiment have a V-shaped cross-section in which cords fit. The profile of the grooves 71 may of course be shaped differently. This profile is preferably adapted to the shape and the profile of the conveyor belt or conveyor straps. At a side facing away from the grooves said cords have a flat or textured surface. For compensating pressure when rolling out it is advantageous when the cords, at least at the location of the rolling out process, abut the counter roller 2 below in the grooves 71.

It will be clear that the exemplary embodiments of the invention described above are intended as an illustration of the invention and not as a limitation of the invention. An expert will certainly be capable of designing alternative embodiments that fall within the scope of protection of the attached claims.

For instance instead of a rolling up device, a device for cutting the dough slice into pieces can be placed. Because the dough slice in the device according to the invention is continuously supported from rolling out to this further treatment device the position of the dough slice in said treatment

device can be reproduced better, as a result of which the dough slice can be cut into the desired pieces in a better reproducible manner.

5 When using a number of conveyor straps placed parallel and with intermediate space as shown in the figures 3 and 4, it is possible to connect a third or even further conveyor devices to each other such that the conveyor straps of two adjacent conveyor devices circulate over a same circulating roller or tail pulley, wherein the conveyor straps of the one belt conveyor are situated between the conveyor straps of the other belt conveyor, as shown
10 in the figures 3 and 4. In this way the dough portion can be continuously supported during the entire treatment.

Claims

1. Device for forming a dough portion comprising a pressure roller and a counter roller placed below it for in between them rolling out the dough portion into a dough slice, wherein the device comprises a conveyor belt for conveying and at least in the direction of conveyance supporting the dough slice to a further treatment device during and after rolling out, wherein the conveyor belt is passed through between the pressure roller and the counter roller and abuts the counter roller.

2. Device according to claim 1, wherein the conveyor belt supports the dough slice in the further treatment device.

3. Device according to claim 1 or 2, wherein the counter roller has a diameter that is, preferably several times, larger than the diameter of the pressure roller.

4. Device according to claim 3, wherein the pressure roller is placed downstream of a vertical plane through the centre line of the counter roller.

5. Device according to claim 4, wherein the conveyor belt is positioned for conveyance in downward inclined direction.

6. Device according to claim 3, 4 or 5, furthermore comprising a feed conveyor with discharge end which considered in direction of conveyance is situated at a distance upstream of the pressure roller.

7. Device according to claim 2, wherein the further treatment device

comprises a device for rolling up the dough slice.

8. Device according to any one of the preceding claims, wherein the conveyor belt extends over almost the full width of the counter roller.

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9. Device according to any one of the preceding claims 1-7, wherein the conveyor belt is composed from a number of conveyor straps that are placed parallel and with intermediate space.

10. Device according to claim 9, wherein the conveyor straps are cord-shaped or ribbon-shaped.

11. Device according to claim 9 or 10, wherein the counter roller comprises grooves over its circumferential surface in which grooves the conveyor straps have been placed.

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12. Device according to claim 11, wherein the depth and the width of the grooves almost equal the thickness and the width of the conveyor straps.

13. Device according to claim 11 or 12, wherein the device in the circulation of the grooves comprises cleaning or scraping means for cleaning the grooves.

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14. Device according to claim 9-13, wherein the conveyor straps form a first belt conveyor and wherein the device comprises a second belt conveyor, which comprises a number of further conveyor straps placed parallel and with intermediate space, wherein the conveyor straps of the first belt conveyor are situated between the conveyor straps of the second belt conveyor at the location of the transition from the first to the second belt conveyor.

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15. Device according to claim 14, wherein the second belt conveyor

supports the dough portion in a further treatment device.

16. Device according to any one of the preceding claims, wherein the counter roller is adapted as a circulating roller for the conveyor belt or the conveyor straps.

17. Device according to any one of the preceding claims, wherein the surface of the conveyor belt or conveyor straps for supporting the dough slice is adapted for, at least in the direction of conveyance, holding the dough slice.

18. Device according to claim 17, wherein the surface is provided with a texture.

19. Device according to claim 18, wherein the texture comprises an undulated pattern and/or a series of notches.

20. Device according to any one of the preceding claims, wherein the device in the circulation of the conveyor belt comprises cleaning and/or scraping means for cleaning the conveyor belt or conveyor straps.

21. Assembly for forming a dough portion comprising:

a device for rolling out a dough portion comprising a pressure roller and a counter roller placed below it, wherein the counter roller is adapted as a first circulating roller for a conveyor belt,

a further treatment device comprising a second circulating roller for a conveyor belt, and

a conveyor belt that is wrapped around the first and second circulating rollers for conveying and supporting the dough portion during and after rolling out to and in the further treatment device.

22. Device for forming a dough portion provided with one or more of the

characterising measures described in the attached description and/or shown in the attached drawings.

- 5 23. Assembly for forming a dough portion provided with one or more of the characterising measures described in the attached description and/or shown in the attached drawings.

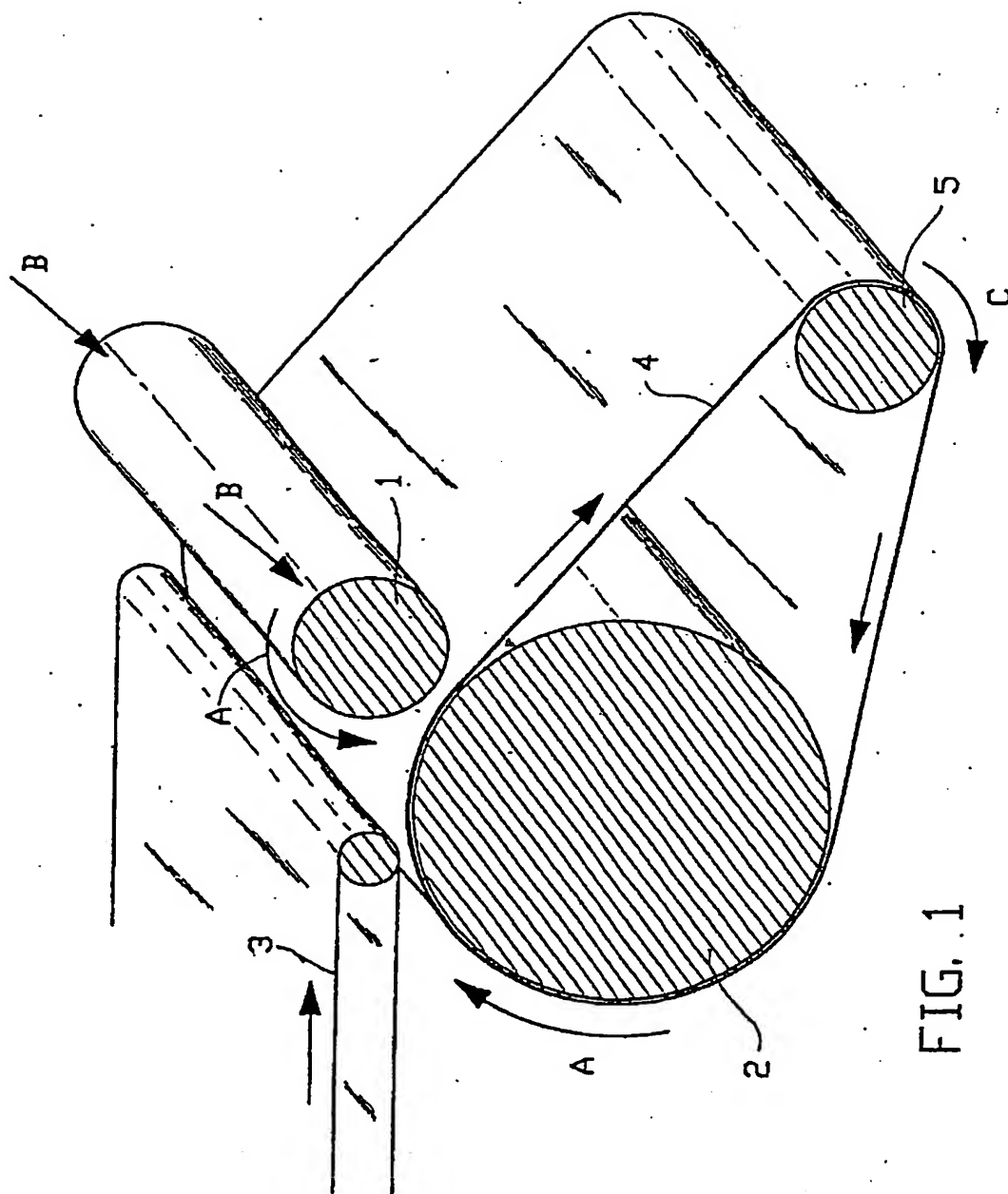


FIG. 1

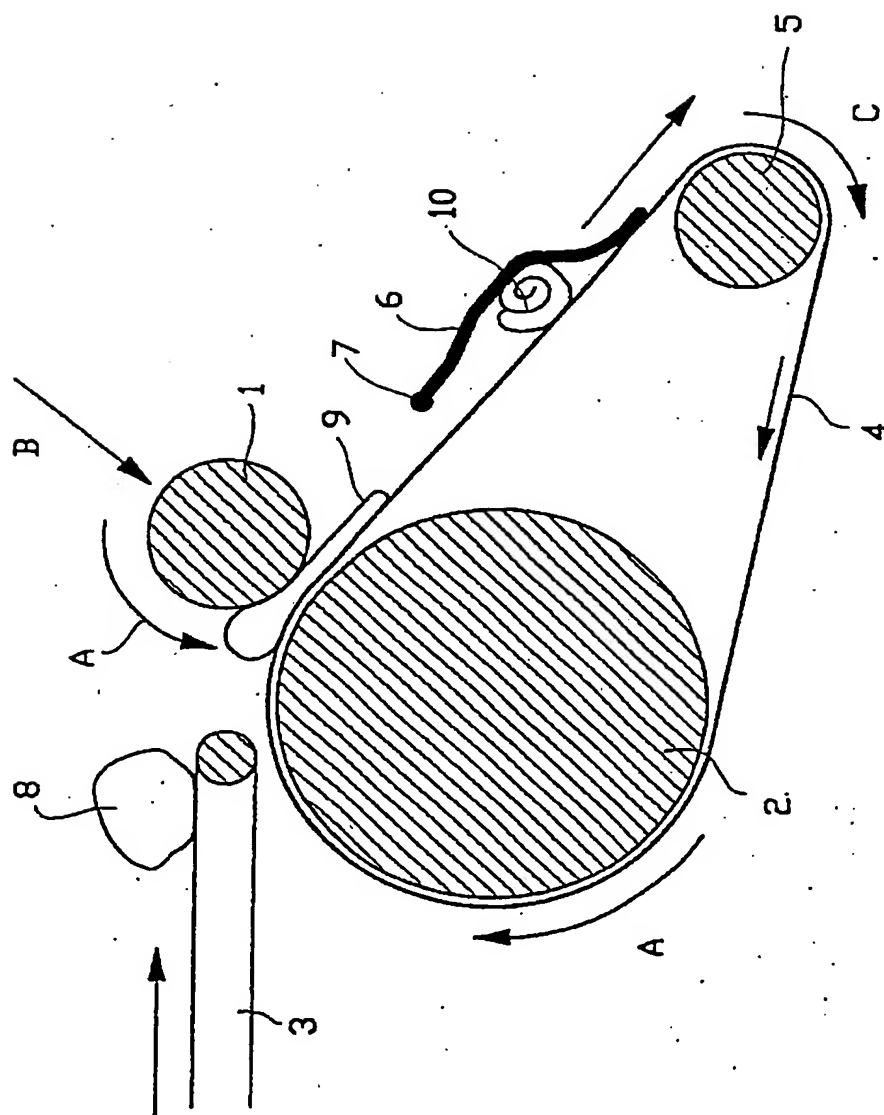


FIG. 2

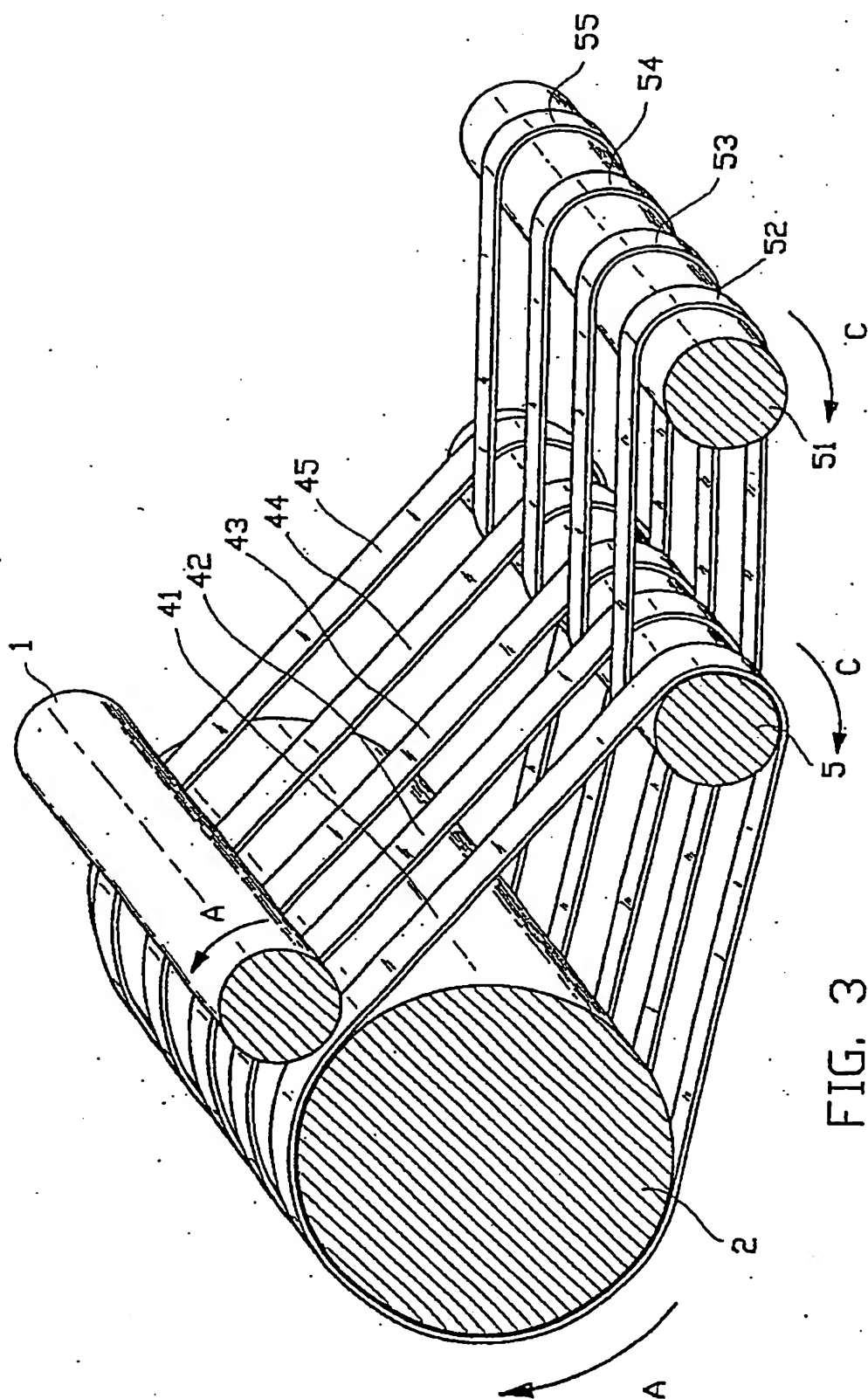
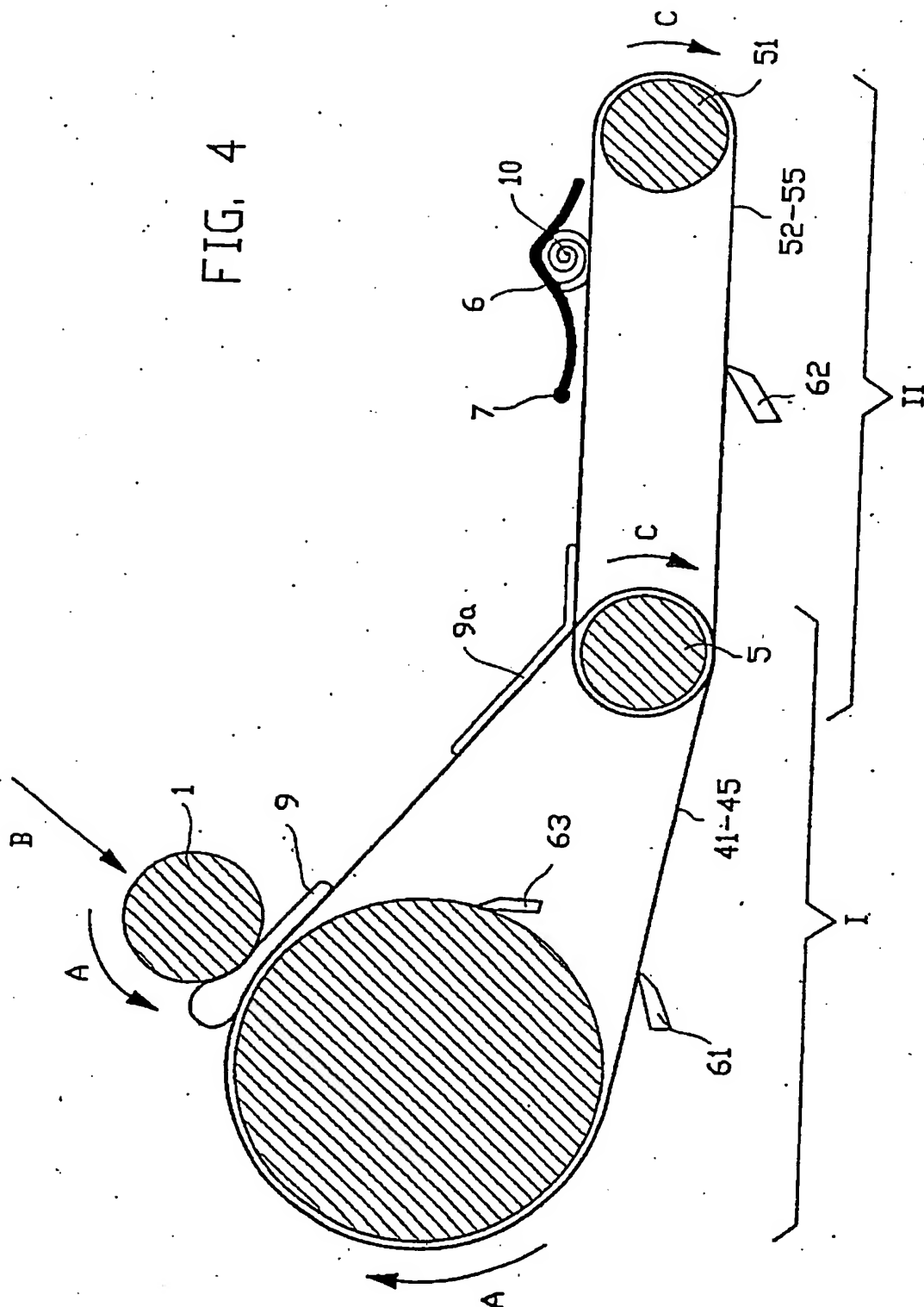


FIG. 3

FIG. 4



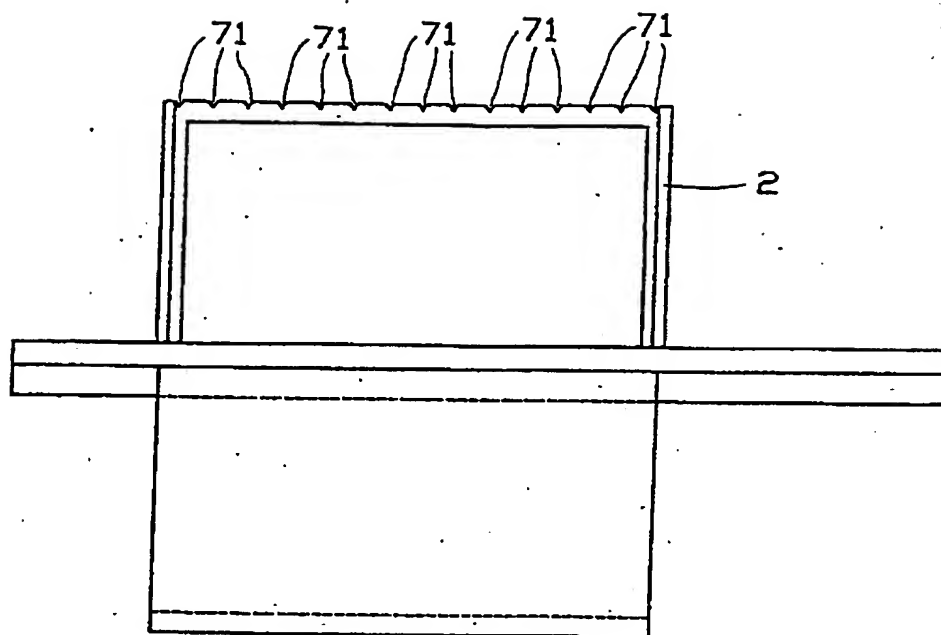


FIG. 5

INTERNATIONAL SEARCH REPORT

National Application No

PCT/NL2004/000200

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A21C3/02 A21C3/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A21C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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-/-		

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

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Silvis, H

INTERNATIONAL SEARCH REPORT

International Application No
PCT/NL2004/000200

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